



SEQUENCE LISTING

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<120> TITLE OF INVENTION: IDENTIFICATION OF SORTASE GENE

<130> FILE REFERENCE: 510015.213

<140> CURRENT APPLICATION NUMBER: US/09/292,437

<141> CURRENT FILING DATE: 1999-04-15

<160> NUMBER OF SEQ ID NOS: 36

<170> SOFTWARE: FastSEQ for Windows Version 3.0

<210> SEQ ID NO 1

<211> LENGTH: 5

<212> TYPE: PRT

<213> ORGANISM: Bacteria

<400> SEQUENCE: 1

Leu Pro Xaa Thr Gly
1 5

<210> 2

<211> 621

<212> DNA

<213> Staphylococcus aureus

<220>

<221> Uncertain

<222> Position 3

<223> Any naturally-occurring amino acid

<400> 2

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atc cta gtg gca gca tat ttg ttt gct aaa cca cat atc gat aat tat 96
Ile Leu Val Ala Ala Tyr Leu Phe Ala Lys Pro His Ile Asp Asn Tyr
20 25 30

ctt cac gat aaa gat aaa gat gaa aag att gaa caa tat gat aaa aat 144
Leu His Asp Lys Asp Lys Asp Glu Lys Ile Glu Gln Tyr Asp Lys Asn
35 40 45

gta aaa gaa cag gcg agt aaa gat aaa aag cag caa gct aaa cct caa 192
Val Lys Glu Gln Ala Ser Lys Asp Lys Lys Gln Gln Ala Lys Pro Gln
50 55 60

att ccg aaa gat aaa tcg aaa gtg gca ggc tat att gaa att cca gat 240
Ile Pro Lys Asp Lys Ser Lys Val Ala Gly Tyr Ile Glu Ile Pro Asp
65 70 75 80

gct gat att aaa gaa cca gta tat cca gga cca gca aca cct gaa caa	288
Ala Asp Ile Lys Glu Pro Val Tyr Pro Gly Pro Ala Thr Pro Glu Gln	
85 90 95	
tta aat aga ggt gta agc ttt gca gaa gaa aat gaa tca cta gat gat	336
Leu Asn Arg Gly Val Ser Phe Ala Glu Glu Asn Glu Ser Leu Asp Asp	
100 105 110	
caa aat att tca att gca gga cac act ttc att gac cgt ccg aac tat	384
Gln Asn Ile Ser Ile Ala Gly His Thr Phe Ile Asp Arg Pro Asn Tyr	
115 120 125	
caa ttt aca aat ctt aaa gca gcc aaa aaa ggt agt atg gtg tac ttt	432
Gln Phe Thr Asn Leu Lys Ala Ala Lys Lys Gly Ser Met Val Tyr Phe	
130 135 140	
aaa gtt ggt aat gaa aca cgt aag tat aaa atg aca agt ata aga gat	480
Lys Val Gly Asn Glu Thr Arg Lys Tyr Lys Met Thr Ser Ile Arg Asp	
145 150 155 160	
gtt aag cct aca gat gta gga gtt cta gat gaa caa aaa ggt aaa gat	528
Val Lys Pro Thr Asp Val Gly Val Leu Asp Glu Gln Lys Gly Lys Asp	
165 170 175	
aaa caa tta aca tta att act tgt gat gat tac aat gaa aag aca ggc	576
Lys Gln Leu Thr Leu Ile Thr Cys Asp Asp Tyr Asn Glu Lys Thr Gly	
180 185 190	
gtt tgg gaa aaa cgt aaa atc ttt gta gct aca gaa gtc aaa taa	621
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195 200 205	

<210> 3

<211> 206

<212> PRT

<213> Staphylococcus aureus

<400> 3

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Leu His Asp Lys Asp Lys Asp Glu Lys Ile Glu Gln Tyr Asp Lys Asn	
35 40 45	
Val Lys Glu Gln Ala Ser Lys Asp Lys Lys Gln Gln Ala Lys Pro Gln	
50 55 60	
Ile Pro Lys Asp Lys Ser Lys Val Ala Gly Tyr Ile Glu Ile Pro Asp	
65 70 75 80	
Ala Asp Ile Lys Glu Pro Val Tyr Pro Gly Pro Ala Thr Pro Glu Gln	
85 90 95	
Leu Asn Arg Gly Val Ser Phe Ala Glu Glu Asn Glu Ser Leu Asp Asp	
100 105 110	
Gln Asn Ile Ser Ile Ala Gly His Thr Phe Ile Asp Arg Pro Asn Tyr	
115 120 125	
Gln Phe Thr Asn Leu Lys Ala Ala Lys Lys Gly Ser Met Val Tyr Phe	

130		135		140
Lys Val Gly Asn Glu Thr Arg Lys Tyr Lys Met Thr Ser Ile Arg Asp				
145		150		155
Val Lys Pro Thr Asp Val Gly Val Leu Asp Glu Gln Lys Gly Lys Asp				
	165		170	
Lys Gln Leu Thr Leu Ile Thr Cys Asp Asp Tyr Asn Glu Lys Thr Gly				
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195		200		205

<210> 4
 <211> 227
 <212> PRT
 <213> Streptococcus pyogenes

<400> 4

Met Glu Glu Val Trp Gln Lys Ala Lys Ala Tyr Asn Ala Arg Leu Gly			
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	20	25	30
Lys Asn Tyr Glu Ser Leu Leu Gln Ile Glu Asn Asn Asp Ile Met Gly			
	35	40	45
Tyr Val Glu Val Pro Ser Ile Lys Val Thr Leu Pro Ile Tyr His Tyr			
	50	55	60
Thr Thr Asp Glu Val Leu Thr Lys Gly Ala Gly His Leu Phe Gly Ser			
65	70	75	80
Ala Leu Pro Val Gly Gly Asp Gly Thr His Thr Val Ile Ser Ala His			
	85	90	95
Arg Gly Leu Pro Ser Ala Glu Met Phe Thr Asn Leu Asn Leu Val Lys			
	100	105	110
Lys Gly Asp Thr Phe Tyr Phe Arg Val Leu Asn Lys Val Leu Ala Tyr			
	115	120	125
Lys Val Asp Gln Ile Leu Thr Val Glu Pro Asp Gln Val Thr Ser Leu			
	130	135	140
Ser Gly Val Met Gly Lys Asp Tyr Ala Thr Leu Val Thr Cys Thr Pro			
145	150	155	160
Tyr Gly Val Asn Thr Lys Arg Leu Leu Val Arg Gly His Arg Ile Ala			
	165	170	175
Tyr His Tyr Lys Lys Tyr Gln Gln Ala Lys Lys Ala Met Lys Leu Val			
	180	185	190
Asp Lys Ser Arg Met Trp Ala Glu Val Val Cys Ala Ala Phe Gly Val			
	195	200	205
Val Ile Ala Ile Ile Leu Val Phe Met Tyr Ser Arg Val Ser Ala Lys			
	210	215	220
Lys Ser Lys			
225			

<210> 5
 <211> 365
 <212> PRT
 <213> Actinomyces naeslundii

<400> 5

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	20	25	30

Arg	Pro	Asp	Ala	Lys	Thr	Gln	Val	Glu	Gln	Ala	His	Ala	Tyr	Asn	Asp
		35					40					45			
Ala	Leu	Ser	Ala	Gly	Ala	Val	Leu	Glu	Ala	Asn	Asn	His	Val	Pro	Thr
	50					55					60				
Gly	Ala	Gly	Ser	Ser	Lys	Asp	Ser	Ser	Leu	Gln	Tyr	Ala	Asn	Ile	Leu
65					70					75				80	
Lys	Ala	Asn	Asn	Glu	Gly	Leu	Met	Ala	Arg	Leu	Lys	Ile	Pro	Ser	Ile
			85						90					95	
Ser	Leu	Asp	Leu	Pro	Val	Tyr	His	Gly	Thr	Ala	Asp	Asp	Thr	Leu	Leu
		100						105					110		
Lys	Gly	Leu	Gly	His	Leu	Glu	Gly	Thr	Ser	Leu	Pro	Val	Gly	Gly	Glu
	115						120					125			
Gly	Thr	Arg	Ser	Val	Ile	Thr	Gly	His	Arg	Gly	Leu	Ala	Glu	Ala	Thr
	130					135					140				
Met	Phe	Thr	Asn	Leu	Asp	Lys	Val	Lys	Thr	Gly	Asp	Ser	Leu	Ile	Val
145					150					155				160	
Glu	Val	Phe	Gly	Glu	Val	Leu	Thr	Tyr	Arg	Val	Thr	Ser	Thr	Lys	Val
			165						170					175	
Val	Glu	Pro	Glu	Glu	Thr	Glu	Ala	Leu	Arg	Val	Glu	Glu	Gly	Lys	Asp
		180						185					190		
Leu	Leu	Thr	Leu	Val	Thr	Cys	Thr	Pro	Leu	Gly	Ile	Asn	Thr	His	Arg
	195						200					205			
Ile	Leu	Leu	Thr	Gly	Glu	Arg	Ile	Tyr	Pro	Thr	Pro	Ala	Lys	Asp	Leu
	210					215					220				
Ala	Ala	Ala	Gly	Lys	Arg	Pro	Asp	Val	Pro	His	Phe	Pro	Trp	Trp	Ala
225					230					235				240	
Val	Gly	Leu	Ala	Ala	Gly	Leu	Ile	Val	Val	Gly	Leu	Tyr	Leu	Trp	Arg
			245						250					255	
Ser	Gly	Tyr	Ala	Ala	Ala	Arg	Ala	Lys	Glu	Arg	Ala	Leu	Ala	Arg	Ala
		260						265				270			
Arg	Ala	Ala	Gln	Glu	Glu	Pro	Gln	Pro	Gln	Thr	Trp	Ala	Glu	Gln	Met
	275						280					285			
Arg	Ile	Trp	Met	Asp	Asp	Asp	Ala	Gly	Val	Glu	Pro	Gln	Arg	Trp	Phe
	290				295					300					
Thr	Asp	Leu	Pro	Val	Pro	Pro	Gln	Pro	Ser	Glu	Met	Glu	Asn	Leu	Ala
305					310					315				320	
Leu	Leu	Glu	Glu	Ile	Ala	Ser	Leu	Ser	Ala	Pro	Ser	Gly	Arg	Trp	Asp
			325						330					335	
Asp	Gln	Glu	Leu	Ile	Asp	Thr	Ala	Glu	Ile	Pro	Val	Leu	Asp	Ala	Thr
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Arg	Pro	Ser	Ala	Gly	Thr	Ser	Gly	Arg	Thr	His	Arg	Leu			
	355						360					365			

<210> 6

<211> 284

<212> PRT

<213> Enterococcus faecalis

<400> 6

Met	Lys	Ser	Lys	Lys	Lys	Arg	Arg	Ile	Ile	Asp	Gly	Phe	Met	Ile	Leu
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Leu	Leu	Ile	Ile	Gly	Ile	Gly	Ala	Phe	Ala	Tyr	Pro	Phe	Val	Ser	Asp
		20					25					30			
Ala	Leu	Asn	Asn	Tyr	Leu	Asp	Gln	Gln	Ile	Ile	Ala	His	Tyr	Gln	Ala
	35					40					45				
Lys	Ala	Ser	Gln	Glu	Asn	Thr	Lys	Glu	Met	Ala	Glu	Leu	Gln	Glu	Lys
	50					55					60				

Met	Glu	Lys	Lys	Asn	Gln	Glu	Leu	Ala	Lys	Lys	Gly	Ser	Asn	Pro	Gly	65	70	75	80
Leu	Asp	Pro	Phe	Ser	Glu	Thr	Gln	Lys	Thr	Thr	Lys	Lys	Pro	Asp	Lys		85	90	95
Ser	Tyr	Phe	Glu	Ser	His	Thr	Ile	Gly	Val	Leu	Thr	Ile	Pro	Lys	Ile	100	105	110	
Asn	Val	Arg	Leu	Pro	Ile	Phe	Asp	Lys	Thr	Asn	Ala	Leu	Leu	Leu	Glu	115	120	125	
Lys	Gly	Ser	Ser	Leu	Leu	Glu	Gly	Thr	Ser	Tyr	Pro	Thr	Gly	Gly	Thr	130	135	140	
Asn	Thr	His	Ala	Val	Ile	Ser	Gly	His	Arg	Gly	Leu	Pro	Gln	Ala	Lys	145	150	155	160
Leu	Phe	Thr	Asp	Leu	Pro	Glu	Leu	Lys	Lys	Gly	Asp	Glu	Phe	Tyr	Ile	165	170	175	
Glu	Val	Asn	Gly	Lys	Thr	Leu	Ala	Tyr	Gln	Val	Asp	Gln	Ile	Lys	Thr	180	185	190	
Val	Glu	Pro	Thr	Asp	Thr	Lys	Asp	Leu	His	Ile	Glu	Ser	Gly	Gln	Asp	195	200	205	
Leu	Val	Thr	Leu	Leu	Thr	Cys	Thr	Pro	Tyr	Met	Ile	Asn	Ser	His	Arg	210	215	220	
Leu	Leu	Val	Arg	Gly	His	Arg	Ile	Pro	Tyr	Gln	Pro	Glu	Lys	Ala	Ala	225	230	235	240
Ala	Gly	Met	Lys	Lys	Val	Ala	Gln	Gln	Gln	Asn	Leu	Leu	Leu	Trp	Thr	245	250	255	
Leu	Leu	Leu	Ile	Ala	Cys	Ala	Leu	Ile	Ser	Gly	Phe	Ile	Ile	Trp		260	265	270	
Tyr	Lys	Arg	Arg	Lys	Lys	Thr	Thr	Arg	Lys	Pro	Lys					275	280		

<210> 7

<211> 246

<212> PRT

<213> Streptococcus mutans

<400> 7

Met	Lys	Lys	Glu	Arg	Gln	Ser	Arg	Lys	Lys	Arg	Ser	Phe	Leu	Arg	Thr	1	5	10	15
Phe	Leu	Pro	Ile	Leu	Leu	Leu	Val	Ile	Gly	Leu	Ala	Leu	Ile	Phe	Asn	20	25	30	
Thr	Pro	Ile	Arg	Asn	Ala	Leu	Ile	Ala	Trp	Asn	Thr	Asn	Arg	Tyr	Gln	35	40	45	
Val	Ser	Asn	Val	Ser	Lys	Lys	Asp	Ile	Glu	His	Asn	Lys	Ala	Ala	His	50	55	60	
Ser	Ser	Phe	Asp	Phe	Lys	Lys	Val	Glu	Ser	Ile	Ser	Thr	Gln	Ser	Val	65	70	75	80
Leu	Ala	Ala	Gln	Met	Ala	Ala	Gln	Lys	Leu	Pro	Val	Ile	Gly	Gly	Ile	85	90	95	
Ala	Ile	Pro	Asp	Leu	Lys	Ile	Asn	Leu	Pro	Ile	Phe	Lys	Gly	Leu	Asp	100	105	110	
Asn	Val	Gly	Leu	Thr	Tyr	Gly	Ala	Gly	Thr	Met	Lys	Asn	Asp	Gln	Val	115	120	125	
Met	Gly	Glu	Asn	Asn	Tyr	Ala	Leu	Ala	Ser	His	His	Val	Phe	Gly	Met	130	135	140	
Thr	Gly	Ser	Ser	Gln	Met	Leu	Phe	Ser	Pro	Leu	Glu	Arg	Ala	Lys	Glu	145	150	155	160
Gly	Met	Glu	Ile	Tyr	Leu	Thr	Asp	Lys	Asn	Lys	Val	Tyr	Thr	Tyr	Val	165	170	175	

Ile	Ser	Glu	Val	Lys	Thr	Val	Thr	Pro	Glu	His	Val	Glu	Val	Ile	Asp
			180					185					190		
Asn	Arg	Pro	Gly	Gln	Asn	Glu	Val	Thr	Leu	Val	Thr	Cys	Thr	Asp	Ala
		195					200					205			
Gly	Ala	Thr	Ala	Arg	Thr	Ile	Val	His	Gly	Thr	Tyr	Lys	Gly	Glu	Asn
	210					215					220				
Asp	Phe	Asn	Lys	Thr	Ser	Lys	Lys	Ile	Lys	Lys	Ala	Phe	Arg	Gln	Ser
225					230					235					240
Tyr	Asn	Gln	Ile	Ser	Phe										
				245											

<210> 8
 <211> 198
 <212> PRT
 <213> Bacillus subtilis

<400> 8

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Ala	Gly	Tyr	Gly	Gly	Phe	Lys	Leu	Ile	Asp	Thr	Asn	Thr	Lys	Thr	Glu
		20					25					30			
Gln	Thr	Leu	Lys	Glu	Ala	Lys	Leu	Ala	Ala	Lys	Lys	Pro	Gln	Glu	Ala
	35					40					45				
Ser	Gly	Thr	Lys	Asn	Ser	Thr	Asp	Gln	Ala	Lys	Asn	Lys	Ala	Ser	Phe
50					55						60				
Lys	Pro	Glu	Thr	Gly	Gln	Ala	Ser	Gly	Ile	Leu	Glu	Ile	Pro	Lys	Ile
65				70					75				80		
Asn	Ala	Glu	Leu	Pro	Ile	Val	Glu	Gly	Thr	Asp	Ala	Asp	Asp	Leu	Glu
			85					90					95		
Lys	Gly	Val	Gly	His	Tyr	Lys	Asp	Ser	Tyr	Tyr	Pro	Asp	Glu	Asn	Gly
		100					105					110			
Gln	Ile	Val	Leu	Ser	Gly	His	Arg	Asp	Thr	Val	Phe	Arg	Arg	Thr	Gly
	115					120					125				
Glu	Leu	Glu	Lys	Gly	Asp	Gln	Leu	Arg	Leu	Leu	Leu	Ser	Tyr	Gly	Glu
	130					135					140				
Phe	Thr	Tyr	Glu	Ile	Val	Lys	Thr	Lys	Ile	Val	Asp	Lys	Asp	Asp	Thr
145				150					155					160	
Ser	Ile	Ile	Thr	Leu	Gln	His	Glu	Lys	Glu	Glu	Leu	Ile	Leu	Thr	Thr
			165					170					175		
Cys	Tyr	Pro	Phe	Ser	Tyr	Val	Gly	Asn	Ala	Pro	Lys	Arg	Tyr	Ile	Ile
		180						185					190		
Tyr	Gly	Lys	Arg	Val	Thr										
		195													

<210> 9
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 <212> PRT
 <213> Staphylococcus aureus

<400> 9

Glu	Glu	Asn	Pro	Phe	Ile	Gly	Thr	Thr	Val	Phe	Gly	Gly	Leu	Ser	Leu
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Ala	Leu	Gly	Ala	Ala	Leu	Leu	Ala	Gly							
		20					25								

<210> 10
 <211> 23

<212> PRT

<213> Staphylococcus aureus

<400> 10

Gly	Glu	Glu	Ser	Thr	Asn	Lys	Gly	Met	Leu	Phe	Gly	Gly	Leu	Phe	Ser
1				5				10						15	
Ile	Leu	Gly	Leu	Ala	Leu	Leu									
			20												

<210> 11

<211> 24

<212> PRT

<213> Staphylococcus sobrinus

<400> 11

Asp	Ser	Ser	Asn	Ala	Tyr	Leu	Pro	Leu	Leu	Gly	Leu	Val	Ser	Leu	Thr
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Ala	Gly	Phe	Ser	Leu	Leu	Gly	Leu								
			20												

<210> 12

<211> 24

<212> PRT

<213> Enterococcus faecalis

<400> 12

Glu	Lys	Gln	Asn	Val	Leu	Leu	Thr	Val	Val	Gly	Ser	Leu	Ala	Ala	Met
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Leu	Gly	Leu	Ala	Gly	Leu	Gly	Phe								
			20												

<210> 13

<211> 23

<212> PRT

<213> Streptococcus pyogenes

<400> 13

Ser	Ile	Gly	Thr	Tyr	Leu	Phe	Lys	Ile	Gly	Ser	Ala	Ala	Met	Ile	Gly
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Ala	Ile	Gly	Ile	Tyr	Ile	Val									
			20												

<210> 14

<211> 22

<212> PRT

<213> Listeria monocytogenes

<400> 14

Asp	Ser	Asp	Asn	Ala	Leu	Tyr	Leu	Leu	Leu	Gly	Leu	Leu	Ala	Val	Gly
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Thr	Ala	Met	Ala	Leu	Thr										
			20												

<210> 15

<211> 5

<212> PRT

<213> Staphylococcus aureus

<400> 15

Arg Arg Arg Glu Leu
1 5

<210> 16

<211> 9

<212> PRT

<213> Staphylococcus aureus

<400> 16

Arg Arg Asn Lys Lys Asn His Lys Ala
1 5

<210> 17

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<213> Staphylococcus sobrinus

<400> 17

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1 5

<210> 18

<211> 7

<212> PRT

<213> Enterococcus faecalis

<400> 18

Lys Arg Arg Lys Glu Thr Lys
1 5

<210> 19

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<212> PRT

<213> Streptococcus pyogenes

<400> 19

Lys Arg Arg Lys Ala
1 5

<210> 20

<211> 8

<212> PRT

<213> Actinomyces viscosus

<400> 20

Lys Arg Arg His Val Ala Lys His
1 5

<210> 21

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<212> PRT

<213> Streptococcus agalactiae

<400> 21

Lys Arg Arg Lys Ser
1 5

<210> 22
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<212> PRT
<213> Streptococcus pyogenes

<400> 22
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1 5

<210> 23
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<213> Mutated derived from streptococcus pyogenes

<400> 23
Arg Arg Arg Glu Ser
1 5

<210> 24
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<400> 24
Arg Arg Arg Ser Leu
1 5

<210> 25
<211> 5
<212> PRT
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<400> 25
Arg Arg Ser Glu Leu
1 5

<210> 26
<211> 5
<212> PRT
<213> Mutated derived from streptococcus pyogenes

<400> 26
Arg Ser Arg Glu Leu
1 5

<210> 27
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<400> 27
Ser Arg Arg Glu Leu
1 5

<210> 28
<211> 5

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<212> PRT
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<400> 28
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<210> 29
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<400> 29
Arg Ser Arg Ser Ser
 1                5

<210> 30
<211> 5
<212> PRT
<213> Mutated derived from streptococcus pyogenes

<400> 30
Ser Arg Arg Ser Ser
 1                5

<210> 31
<211> 19
<212> PRT
<213> Mutated derived from streptococcus pyogenes

<400> 31
His His His His His His Ala Gln Ala Leu Glu Pro Thr Gly Glu Glu
 1                5                10                15
Asn Pro Phe

<210> 32
<211> 29
<212> DNA
<213> Staphylococcus aureus

<400> 32
aaggattcaa aaggagcggg atacattgc
29

<210> 33
<211> 29
<212> DNA
<213> Staphylococcus aureus

<400> 33
aagatccta ccttttctc tagctgaac
29

<210> 34
<211> 283
<212> PRT
<213> Streptococcus pneumoniae srtA

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<400> 34

Met	Ser	Arg	Thr	Lys	Leu	Arg	Ala	Leu	Leu	Gly	Tyr	Leu	Leu	Met	Leu
1				5					10					15	
Val	Ala	Cys	Leu	Ile	Pro	Ile	Tyr	Cys	Phe	Gly	Gln	Met	Val	Leu	Gln
			20					25					30		
Ser	Leu	Gly	Gln	Val	Lys	Gly	His	Ala	Thr	Phe	Val	Lys	Ser	Met	Thr
		35					40					45			
Thr	Glu	Met	Tyr	Gln	Glu	Gln	Asn	His	Ser	Leu	Ala	Tyr	Asn	Gln	
		50				55					60				
Arg	Leu	Ala	Ser	Gln	Asn	Arg	Ile	Val	Asp	Pro	Phe	Leu	Ala	Glu	Gly
65					70					75				80	
Tyr	Glu	Val	Asn	Tyr	Gln	Val	Ser	Asp	Asp	Pro	Asp	Ala	Val	Tyr	Gly
			85						90					95	
Tyr	Leu	Ser	Ile	Pro	Ser	Leu	Glu	Ile	Met	Glu	Pro	Val	Tyr	Leu	Gly
			100					105					110		
Ala	Asp	Tyr	His	His	Leu	Gly	Met	Gly	Leu	Ala	His	Val	Asp	Gly	Thr
		115					120					125			
Pro	Leu	Pro	Leu	Asp	Gly	Thr	Gly	Ile	Arg	Ser	Val	Ile	Ala	Gly	His
		130				135					140				
Arg	Ala	Glu	Pro	Ser	His	Val	Phe	Phe	Arg	His	Leu	Asp	Gln	Leu	Lys
145					150					155				160	
Val	Gly	Asp	Ala	Leu	Tyr	Tyr	Asp	Asn	Gly	Gln	Glu	Ile	Val	Glu	Tyr
			165						170					175	
Gln	Met	Met	Asp	Thr	Glu	Ile	Ile	Leu	Pro	Ser	Glu	Trp	Glu	Lys	Leu
			180					185					190		
Glu	Ser	Val	Ser	Ser	Lys	Asn	Ile	Met	Thr	Leu	Ile	Thr	Cys	Asp	Pro
		195					200					205			
Ile	Pro	Thr	Phe	Asn	Lys	Arg	Leu	Leu	Val	Asn	Phe	Glu	Arg	Val	Ala
		210				215					220				
Val	Tyr	Gln	Lys	Ser	Asp	Pro	Gln	Thr	Ala	Ala	Val	Ala	Arg	Val	Ala
225					230					235				240	
Phe	Thr	Lys	Glu	Gly	Gln	Ser	Val	Ser	Arg	Val	Ala	Thr	Ser	Gln	Trp
			245						250					255	
Leu	Tyr	Arg	Gly	Leu	Val	Val	Leu	Ala	Phe	Leu	Gly	Ile	Leu	Phe	Val
			260					265					270		
Leu	Trp	Lys	Leu	Ala	Arg	Leu	Leu	Arg	Gly	Lys					
		275					280								

<210> 35

<211> 296

<212> PRT

<213> Streptococcus pneumoniae srtB

<400> 35

Met	Asp	Asn	Ser	Arg	Arg	Ser	Arg	Lys	Lys	Gly	Thr	Lys	Lys	Lys	Lys
1				5					10					15	
His	Pro	Leu	Ile	Leu	Leu	Leu	Ile	Phe	Leu	Val	Gly	Phe	Ala	Val	Ala
			20					25					30		
Ile	Tyr	Pro	Leu	Val	Ser	Arg	Tyr	Tyr	Tyr	Arg	Ile	Ser	Asn	Glu	Val
		35					40					45			
Ile	Lys	Glu	Phe	Asp	Glu	Thr	Val	Ser	Gln	Met	Asp	Lys	Ala	Glu	Leu
		50				55					60				
Glu	Glu	Arg	Trp	Arg	Leu	Ala	Gln	Ala	Phe	Asn	Ala	Thr	Leu	Lys	Pro
65					70					75				80	
Ser	Glu	Ile	Leu	Asp	Pro	Phe	Thr	Glu	Gln	Glu	Lys	Lys	Lys	Gly	Val
			85						90					95	
Ser	Glu	Tyr	Ala	Asn	Met	Leu	Lys	Val	His	Glu	Arg	Ile	Gly	Tyr	Val

	100		105		110
Glu Ile Pro Ala Ile Asp Gln Glu Ile Pro Met Tyr Val Gly Thr Ser					
	115		120		125
Glu Asp Ile Leu Gln Lys Gly Ala Gly Leu Leu Glu Gly Ala Ser Leu					
	130		135		140
Pro Val Gly Gly Glu Asn Thr His Thr Val Ile Thr Ala His Arg Gly					
145		150		155	160
Leu Pro Thr Ala Glu Leu Phe Ser Gln Leu Asp Lys Met Lys Lys Gly					
	165		170		175
Asp Ile Phe Tyr Leu His Val Leu Asp Gln Val Leu Ala Tyr Gln Val					
	180		185		190
Asp Gln Ile Val Thr Val Glu Pro Asn Asp Phe Glu Pro Val Leu Ile					
	195		200		205
Gln His Gly Glu Asp Tyr Ala Thr Leu Leu Thr Cys Thr Pro Tyr Met					
	210		215		220
Ile Asn Ser His Arg Leu Leu Val Arg Gly Lys Arg Ile Pro Tyr Thr					
225		230		235	240
Ala Pro Ile Ala Glu Arg Asn Arg Ala Val Arg Glu Arg Gly Gln Phe					
	245		250		255
Trp Leu Trp Leu Leu Leu Gly Ala Met Ala Val Ile Leu Leu Leu Leu					
	260		265		270
Tyr Arg Val Tyr Arg Asn Arg Arg Ile Val Lys Gly Leu Glu Lys Gln					
	275		280		285
Leu Glu Gly Arg His Val Lys Asp					
	290		295		

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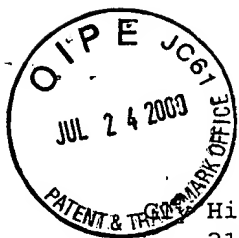
<211> 304

<212> PRT

<213> Streptococcus pneumoniae srtC

<400> 36

Met Leu Ile Lys Met Val Lys Thr Lys Lys Gln Lys Arg Asn Asn Leu					
1		5		10	15
Leu Leu Gly Val Val Phe Phe Ile Gly Met Ala Val Met Ala Tyr Pro					
	20		25		30
Leu Val Ser Arg Leu Tyr Tyr Arg Val Glu Ser Asn Gln Gln Ile Ala					
	35		40		45
Asp Phe Asp Lys Glu Lys Ala Thr Leu Asp Glu Ala Asp Ile Asp Glu					
	50		55		60
Arg Met Lys Leu Ala Gln Ala Phe Asn Asp Ser Leu Asn Asn Val Val					
65		70		75	80
Ser Gly Asp Pro Trp Ser Glu Glu Met Lys Lys Lys Gly Arg Ala Glu					
	85		90		95
Tyr Ala Arg Met Leu Glu Ile His Glu Arg Met Gly His Val Glu Ile					
	100		105		110
Pro Val Ile Asp Val Asp Leu Pro Val Tyr Ala Gly Thr Ala Glu Glu					
	115		120		125
Val Leu Gln Gln Gly Ala Gly His Leu Glu Gly Thr Ser Leu Pro Ile					
	130		135		140
Gly Gly Asn Ser Thr His Ala Val Ile Thr Ala His Thr Gly Leu Pro					
145		150		155	160
Thr Ala Lys Met Phe Thr Asp Leu Thr Lys Leu Lys Val Gly Asp Lys					
	165		170		175
Phe Tyr Val His Asn Ile Lys Glu Val Met Ala Tyr Gln Val Asp Gln					
	180		185		190
Val Lys Val Ile Glu Pro Thr Asn Phe Asp Asp Leu Leu Ile Val Pro					



195	200	205
His Asp Tyr Val Thr Leu Leu Thr Cys Thr Pro Tyr Met Ile Asn		
210	215	220
Thr His Arg Leu Leu Val Arg Gly His Arg Ile Pro Tyr Val Ala Glu		
225	230	235
Val Glu Glu Glu Phe Ile Ala Ala Asn Lys Leu Ser His Leu Tyr Arg		
245	250	255
Tyr Leu Phe Tyr Val Ala Val Gly Leu Ile Val Ile Leu Leu Trp Ile		
260	265	270
Ile Arg Arg Leu Arg Lys Lys Lys Lys Gln Pro Glu Lys Ala Leu Lys		
275	280	285
Ala Leu Lys Ala Ala Arg Lys Glu Val Lys Val Glu Asp Gly Gln Gln		
290	295	300